

BIOLOGICAL OPINION SUMMARY
Castle Creek Wilderness Prescribed Natural Fire Plan

Date of opinion: May 15, 2000

Action agency: U.S. Forest Service

Project: Castle Creek Wilderness Prescribed Natural Fire Plan

Location: Bradshaw Ranger District, Prescott National Forest

Listed species affected: The threatened Mexican spotted owl (*Strix occidentalis lucida*)

Biological opinion: Non-jeopardy

Incidental take statement:

Level of take anticipated: A) One MSO or one pair and/or associated eggs/juveniles in the form of direct mortality; B) Harm and harassment of MSO and modification of 500 acres of restricted and protected habitat per year caused by PNF for which adequate surveys have not been conducted, and; C) Harm and harassment of MSO and habitat modification of up to one PAC and 500 acres of restricted and protected habitat caused by wildfire as an indirect result of PNF during the life of the Plan. Incidental take as described in items B and C will only be tallied and reported in the MSO baseline if and when it occurs. Exceeding this level would require reinitiation of formal consultation.

Reasonable and prudent measures: The biological opinion presents four measures for assisting in the reduction of incidental take: 1) The Forest Service will implement the proposed actions in a manner that minimizes adverse effects to MSO and potentially occupied MSO restricted and protected habitat; 2) Personnel education/information programs and well-defined operational procedures shall be implemented; 3) If fire suppression is initiated, suppression activities shall be carried out in a manner to reduce potential adverse effects to the MSO and its habitat, unless such actions would harm life or property, and; 4) The Forest shall document all actions, report incidental take, and monitor the effects of the proposed action on habitat. These findings shall be reported to the Service. Implementation of the measure through the terms and conditions are mandatory.

Terms and conditions: Ten mandatory terms and conditions are included to implement the reasonable and prudent measures. The terms and conditions require that the Forest Service minimizes adverse effects of PNF actions on MSO protected and restricted habitat in various ways, provides upper size limits for acres of MSO habitat affected by any type of

fire within the project area, requires a resource advisor be present during all suppression activities, requires a yearly report from the Forest Service and a yearly meeting with the Service, and requires monitoring.

Conservation recommendations: Two conservation recommendations are provided. These include searching for other means of funding to conduct MSO surveys, and a recommendation to pursue the completion of a forest-wide consultation on wildfire suppression activities. Implementation of these conservation recommendations is discretionary.



United States Department of the Interior

U.S. Fish and Wildlife Service
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 640-2720 FAX: (602) 640-2730



In Reply Refer To:

AESO/SE
2-21-98-F-284

May 25, 2000

Mr. Ernest Del Rio
District Ranger
Bradshaw Ranger District
2230 East Highway 69
Prescott, Arizona 86301

Dear Mr. Del Rio:

The U.S. Fish and Wildlife Service has reviewed the project proposal for the Castle Creek Wilderness Prescribed Natural Fire Program. Your October 28, 1998, request for formal consultation was received on November 2, 1998. This document represents the Service's biological opinion on the effects of the proposed action on the Mexican spotted owl (*Strix occidentalis lucida*) (MSO) in accordance with section 7 of the Endangered Species Act of 1973, as amended, (16 U.S.C. 1531 *et seq.*).

According to the October 28, 1998, biological assessment (BA) of the Castle Creek Wilderness Prescribed Natural Fire Plan, the Forest Service determined that the preferred alternative may affect the MSO. Because critical habitat for the MSO was revoked (63 FR 14378), no conferencing or consultation is required for critical habitat for this species.

This biological opinion is based on information provided in the BA, the July 30, 1998, environmental assessment for the implementation of a prescribed fire program within Woodchute, Juniper Mesa, Apache Creek, and Castle Creek Wildernesses, field trips, meetings, and other sources of information. Literature cited in this biological opinion does not represent a complete bibliography of literature available on the MSO or the effects of fire on the species, or other subjects that may have been considered in this opinion. A complete administrative record of this consultation is on file in the Arizona Ecological Services Field Office.

CONSULTATION HISTORY

Informal consultation on the Castle Creek Wilderness Prescribed Natural Fire Plan began on April 24, 1998, when the Forest Service issued a scoping letter requesting comments on fire management planning for the Woodchute, Juniper Mesa, Apache Creek, and Castle Creek Wilderness Areas. On May 26, 1998, the Service responded to that request with a species list to the Forest Service. Discussions continued with meetings, telephone calls, and a site visit in

Mr. Ernest Del Rio

the summer of 1998. On July 22, 1998, at the request of the Forest Service, the Service provided by email a list of points of discussion and information needs that had been developed for a similar project on another Forest. The Service received, informally, a copy of the draft July 30, 1998, EA; comments were requested by September 14, 1998. On August 6, 1998, the Forest Service issued a pre-decision for prescribing the use of fires within the four wilderness areas. On August 6, 1998, a meeting regarding this project was conducted in Prescott. On September 10, 1998, the Service issued a letter to the Forest Service containing comments on the EA. On October 27, 1998, the Forest Service issued a letter in response to those comments and notified the Service that biological assessments for the wilderness areas would be forthcoming. On November 2, 1998, the Service received an October 28, 1998, Forest Service request for formal consultation on, and an October 28, 1998, biological assessment of the proposed Castle Creek Wilderness Prescribed Natural Fire Plan. The Service responded on December 2, 1998, with a letter acknowledging the request for formal consultation. On January 25, 1999, the Service received additional information from the Forest Service regarding the proposed action. On February 18 and 22, 1999, the Service provided the Forest Service with additional recommendations regarding the proposed project via email. On March 2, 1999, the Forest Service responded to those recommendations.

On March 9, 1999, the Service issued a draft biological opinion to the Forest Service. The Service received comments from the Forest Service regarding the draft biological opinion on April 26, 1999. On June 10 and 14, and July 7, 1999, the Service and the Forest Service discussed issues regarding the draft biological opinion. On July 9, 1999, the Service responded to the April 26, 1999, Forest Service comments on the draft biological opinion. On August 19, 1999, the Service was advised by the Forest Service that the project was "on hold." On September 3, 1999, the Service recommended that the Forest Service request an extension or withdrawal of the formal consultation if the project was being suspended. On October 8, 1999, the Forest Service requested extension of the formal consultation. On November 3, 1999, a meeting of the Service and Forest Service was conducted to discuss the remaining issues regarding the draft biological opinion. On January 20, 2000, the Service received additional information regarding the remaining issues. On January 27, 2000, a meeting of the Service and Forest Service was conducted to discuss that information. On February 24, and March 1 and 14, 2000, discussion by the Service and the Forest Service of possible additional changes to the project description was conducted. On March 28, 2000, the Forest Service responded to the Service's July 9, 2000, letter regarding the draft biological opinion.

The Forest Service also determined in the BA that the proposed project "may affect, but is not likely to adversely affect" the Gila topminnow (*Poeciliopsis occidentalis occidentalis*). Based on the information presented in the BA, and an August 18, 1998, telephone conversation with Doug Duncan of the Tucson suboffice of the Arizona Ecological Services Office, the Service concurs with that determination of effect.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed project (Bradshaw Ranger District 1998) is to allow lightning caused fire to burn within the 25,227 acre Castle Creek Wilderness on the Bradshaw Ranger District of the Prescott National Forest with the conditions described below. Castle Creek is divided into three zones because of different management and resource concerns. The concerns include threatened and endangered species habitat, private property, and heritage resources.

East Zone

Allow high intensity fires (flame lengths greater than 15 feet) of large size (greater than 1,000 acres). Suppression action would be taken on fires that threaten Horsethief Basin Recreation Area.

Central Zone

Same as for the East Zone except suppression action would be taken on those high intensity fires threatening to enter the West Zone.

West Zone

Allow low intensity surface fires in order to protect threatened and endangered species habitat and heritage resources. Fires would be allowed to make short runs becoming moderately or highly intense resulting in removal of pockets or small stands of pine, pine-oak, and mixed conifer. No more than 20 percent of each burn area, within ponderosa pine, pine-oak, or mixed conifer would exceed flame lengths greater than four feet. A Burn Plan designed to meet these objectives would typically be completed within 1-2 days although current requirements allow 72 hours.

Management Ignited Fire (MIF)

The objective of management ignited fire (MIF) would be to bring fuel loads down to a lower, more natural level, thus allowing lightning ignited fires to burn more safely in these areas at a later time. MIF would be applied to 90 acres of *Pinus ponderosa*/*Quercus arizonica* and *Q. emoryi* within the West Zone of Castle Creek. Flame lengths would be less than 2 feet in length. MIF will be implemented outside of the Mexican spotted owl breeding season (March 1-August 31). The project design includes surveying all habitat meeting the criteria for restricted habitat and a 0.5 mile buffer for Mexican spotted owls with one year of survey (four visits) prior to any MIF. Snags 18inch at diameter breast height (dbh) and greater would be hand-lined prior to implementation and monitored during the fire to further reduce potential loss. The burn plan would be designed to maximize retention of large logs (8 feet long and >

Mr. Ernest Del Rio

12-inch maximum width). A Burn Plan designed to meet these objectives would be developed prior to implementation of any MIF.

Suppression

Suppression action would be taken to prevent escapes through the southern and western boundaries. All human caused fires, and lightning fires threatening to burn onto private property will be suppressed. If at any time the fire is declared to be burning out of prescription or is expected to burn out of prescription, suppression action would be taken. At this point the fire would be declared a wildfire and emergency consultation would be considered. The project design also includes fire suppression with the use of Minimum Impact Suppression Tactics (MIST) to reduce resource damage.

Monitoring

The monitoring plan for Castle Creek includes determining the size of the fire (acres burned) and describing the fire intensity (flame lengths). Generally, for fires greater than 100 acres, the Forest Service will qualitatively evaluate acres burned by effectiveness of the prescription and the impacts of the fire to the vegetation and wildlife habitat (large trees, snags, logs, and overstory). Microhabitat monitoring of all MIF within protected or restricted MSO habitat (90 acres) will be completed according to protocols outlined in the microhabitat monitoring recommended by the MSO Recovery Team (U.S. Forest Service 1998). The random nature of lightning does not allow for predicting where, when, or how many prescribed natural fires may occur. Consequently, the Forest Service believes the validity of microhabitat monitoring protocol is eliminated under these unpredictable conditions.

For the 90 acres of MIF, permanent study plots will be established. These plots will be established and read according to protocols outlined in the microhabitat monitoring recommended by the Recovery Team (U.S. Forest Service 1998). These plots will be sampled prior to ignition and resampled after the burn. This will allow managers to assess the effects of the burn on vegetation and fuel loads (i.e., spotted owl habitat components). The project design includes surveying all habitat meeting the criteria for restricted MSO habitat and a 0.5 mile buffer before any MIF occurs. In a March 2, 1999, email message, the Forest Service confirmed that the MSO restricted habitat scheduled for MIF will be completely surveyed for one more year prior to implementation of the project. They also confirmed that if, for some reason, more than one breeding season elapses between the completion of that second year of survey and initiation of the MIF, then another year of survey is necessary.

In a January 14, 1999, letter, the Forest Service provided the Service with additional protection measures designed for this project. In a March 2, 1999, telephone conversation, the Forest Service confirmed that the measures were incorporated into the project description. The eleven measures of January 14, 1999, are listed below.

Mr. Ernest Del Rio

1. For all MIF actions located in MSO protected and restricted habitat as defined by the MSO recovery plan, the Forest Service shall hand-line all snags 18 inches dbh and greater, and will ensure prescriptions are designed to maximize retention of logs 12 inches and greater at mid-point.
2. All field personnel who implement any portion of the proposed action shall be informed of regulations and protective measures as described herein for the MSO. All field personnel shall be informed that intentional killing, disturbance, or harassment of threatened species is a violation of the Act and could result in prosecution.
3. The Forest Service shall review actions after each year of activity prior to further MIF or PNF within the project area. Such review will take into account the cumulative effects of all fire activities in the project area.
4. The Forest Service shall ensure all pertinent information from the Fish and Wildlife Service biological opinion and Forest Service protection measures are included in final burn plans.
5. A District Biologist or Resource Advisor shall be consulted during all fire suppression activities. The Biologist/Resource Advisor shall possess maps of all PACS and all restricted and protected habitat in the project area and vicinity. The Biologist/Resource Advisor shall coordinate MSO concerns and serve as an advisor to the Incident Commander/Burn Boss. They shall also serve as field contact representatives responsible for coordination with the Service. They shall monitor fire suppression activities to ensure protective measures endorsed by the Incident Commander/Burn Boss are implemented.
6. All fire suppression action in wilderness will occur, to the maximum extent possible, using "Minimum Impact Suppression Tactics." This will include not removing trees over 9 inches dbh, except as needed to secure the fire perimeter or provide for fire fighter safety.
7. If a MSO is encountered during the fire, a District Biologist shall be advised immediately. The biologist shall assess potential harm to the owl and advise the Incident Commander/Burn Boss of methods to prevent harm. The Biologist shall maintain a record of any MSO encountered during the suppression activities. The information for each owl shall include the location, date, and time of observation and general condition of the owl.
8. Areas disturbed during fire suppression activities, such as fire lines, crew camps, and staging areas, shall be rehabilitated, including obliteration of fire lines to prevent use by vehicles or hikers. The effectiveness of such closures shall be monitored on a yearly basis.

9. Fire camps, staging areas, and any other areas of disturbance shall be located outside of MSO PACs and potential nest/roost habitat.
10. Patches of unburned vegetation within burned areas shall not be burned out as a fire suppression measure, except as needed to secure the fire perimeter or provide for fire fighter safety.
11. The Forest Service shall use the Regional micro-habitat monitoring protocol agreed upon by the Forest Service and Service for all pre- and post-fire monitoring for MIF actions.

In a March 2, 1999, email message, the Forest Service confirmed that the following prescription components would be included as part of the proposed project description. In restricted and protected pine-oak habitat, only PNF fires of low to moderate intensity are to occur. Flame lengths will not exceed 4-5 feet. Maximum ambient temperature will be 90 degrees Fahrenheit. Minimum ambient temperature will be 10 degrees Fahrenheit. Relative humidities must be between 15 and 100 percent. Fuel moistures in the 1000-hour fuels must be greater than 13 percent. In restricted and protected mixed conifer habitat, only PNF fires of low intensity are to occur. Flame lengths will not exceed 2-3 feet. Maximum ambient temperature will be 85 degrees Fahrenheit. Minimum ambient temperature will be 10 degrees Fahrenheit. Relative humidities must be between 20 and 100 percent. Fuel moistures in the 1000-hour fuels must be greater than 15 percent. If any one of the environmental conditions of these prescriptions are exceeded in the respective MSO habitat, then PNF will not be allowed at that time in those areas.

In a March 28, 2000, letter, the Forest Service indicated that 1000-hour fuel components of the prescriptions as described above would be modified and replaced in the prescriptions as described below. Table 1 illustrates the relationship between live fuel moisture and 1000-hour fuel moisture that would be used in prescriptions to determine when PNF would be allowed to burn in MSO habitat. The March 28, 2000, letter indicated that this table was intended to apply to PNF in both pine-oak and mixed conifer habitat. The shaded cells of the table indicate combinations of these two prescription components under which PNF would be allowed to occur.

Table 1. Live fuel moisture and 1000-hour fuel combinations where PNF would be allowed to burn in MSO habitat (shaded cells represent combinations where PNF would be allowed to burn).

Live Fuel Moisture (percent)	1000-hour Fuel Moisture (percent)				
	10	11	12	13	14
<70					
>70					

In the March 2, 1999, email message, the Forest Service also confirmed that the following protective measures for components of restricted pine-oak habitat subject to MIF are incorporated into the proposed project. Material 6 inches or greater in size and deep duff layers will be removed from around large trees that are unusually susceptible to mortality. Also, downed logs will not be purposely ignited, and no material will be piled upon them.

In the March 2, 1999, email message, the Forest Service also confirmed that the project description is modified to include additional monitoring to be conducted in restricted and protected MSO habitat in PNF areas. An appropriate number of transect lines will be established within each PNF area after the event. The lines will be established after mortality or damage of trees is expected to be evident, and no later than one year after the event. The first one hundred tree-form oaks and large conifer trees will be identified along each line. Those trees will be classified as to whether they are living, dead, or likely to die. If more than 20 percent of oaks or more than 20 percent of large conifer trees are dead or dying, then that information will be provided to the Service immediately to determine if reconsultation on this project is required.

The portions of this section above that address MIF were part of the original project description with subsequent modifications as described. On March 28, 2000, the Forest Service advised the Service that the area proposed for MIF does not contain restricted MSO pine-oak habitat per the definition of the MSO recovery plan. Because the Forest Service did not provide the Service with any other additional requested modifications to the draft biological opinion regarding the MIF portion of the project, the portions referred to above remain in the project description. The items were also left in the project description because they include general descriptions of the MIF portion of the project. Furthermore, when the MIF portions do refer to the MSO, they include actions that would be appropriate if MSO habitat were to be affected by MIF. Of course, because the project description to be covered by this biological

Mr. Ernest Del Rio

opinion does not now include MIF in MSO habitat (per the information provided in the March 28, 2000, letter), if MIF is subsequently planned for MSO habitat in this area, then additional formal consultation will be necessary.

STATUS OF THE SPECIES

A detailed account of the taxonomy, biology, and reproductive characteristics of the MSO is found in the Final Rule listing the MSO as a threatened species (USDI 1993) and in the Final MSO Recovery Plan (USDI 1995). The information provided in those documents is included herein by reference. Although the MSO's entire range covers a broad area of the southwestern United States and Mexico, much remains unknown about the species' distribution and ecology. This is especially true in Mexico where much of the MSO's range has not been surveyed. The MSO currently occupies a broad geographic area but does not occur uniformly throughout its range. Instead, it occurs in disjunct localities that correspond to forested isolated mountain systems, canyons, and in some cases, steep, rocky canyon lands. The primary administrator of lands supporting MSO in the United States is the U.S. Forest Service. Most owls have been found within Forest Service Region 3 (including 11 National Forests in Arizona and New Mexico). Forest Service Regions 2 and 4 (including 2 National Forests in Colorado and 3 in Utah) support fewer owls. According to the Recovery Plan, 91 percent of MSO known to exist in the United States between 1990 and 1993 occurred on lands administered by the Forest Service.

Surveys have revealed that the species has an affinity for older, well-structured forest, and the species is known to inhabit a physically diverse landscape in the southwestern United States and Mexico. The range of the MSO has been divided into six Recovery Units (RUs), as discussed in the MSO Recovery Plan (USDI 1995). The Recovery Plan reports an estimate of owl sites. An owl "site" is defined as a visual sighting of at least one adult owl or a minimum of two auditory detections in the same vicinity in the same year. This information was reported for 1990-1993. The greatest known concentration of known owl sites in the United States occurs in the Upper Gila Mountains RU (55.9 percent), followed by the Basin and Range-East RU (16.0 percent), Basin and Range-West RU (13.6 percent), Colorado Plateau RU (8.2 percent), Southern Rocky Mountain-New Mexico RU (4.5 percent), and Southern Rocky Mountain-Colorado RU (1.8 percent). Owl surveys conducted from 1990 through 1993 indicate that the species persists in most locations reported prior to 1989.

A reliable estimate of the numbers of owls throughout its entire range is not currently available (USDI 1995) and the quality and quantity of information regarding numbers of MSO vary by source. USDI (1991) reported a total of 2,160 owls throughout the United States. Fletcher (1990) calculated that 2,074 owls existed in Arizona and New Mexico.

At the end of the 1995 field season, the Forest Service reported a total of 866 management territories (MTs) established in locations where at least a single MSO had been identified (U.S. Forest Service, *in litt.* November 9, 1995). The information provided at that time also

Mr. Ernest Del Rio

included a summary of territories and acres of suitable habitat in each RU. Subsequently, a summary of all territory and monitoring data for the 1995 field season on Forest Service lands was provided to the Service on January 22, 1996. There were minor discrepancies in the number of MTs reported in the November and January data. For the purposes of this analysis we are using the more recent information.

The Forest Service has converted some MTs into PACs following the recommendations of the Draft MSO Recovery Plan released in March 1995. The completion of these conversions has typically been driven by project-level consultations with the Service and varies by National Forest.

The Castle Creek Wilderness Prescribed Natural Fire Program project area is located at the northern edge of the Basin and Range-West Recovery Unit as defined by the MSO Recovery Plan (USDI 1995). Geologically, the Basin and Range-West Recovery Unit exhibits horst and graben faulting with numerous fault-block mountains separated by valleys. Complex faulting and canyon carving define the physical landscape within these mountains. These ranges include the Chiricahua, Huachuca, Pinaleno, Bradshaw, Pinal, Santa Catalina, Santa Rita, Patagonia, Santa Teresa, Atascosa, Mule, Dragoon, Peloncillo, Mazatzal, and Rincon Mountains.

Vegetation ranges from desert scrub-land and semi-desert grassland in the valleys upwards to montane forests. Montane vegetation includes interior chaparral, encinal woodlands, and Madrean pine-oak woodlands at low and middle elevations, with ponderosa pine, mixed conifer, and spruce-fir forests at higher elevations.

Mexican spotted owls occupy a wide range of habitat types within this recovery unit. The majority of owls occur in isolated mountain ranges where they inhabit encinal oak woodlands, mixed conifer and pine-oak forests, and rocky canyons.

Federal lands encompass 36 percent of this recovery unit, mostly administered by the Bureau of Land Management followed by the Forest Service and a small portion by the National Park Service. Privately owned lands amount to 22 percent, State lands 19 percent, Tribal lands (San Carlos Apache Reservation) 12 percent, and Department of Defense lands 11 percent. Within this recovery unit, the Mexican spotted owl occupies primarily Forest Service lands, and the majority occur within the Coronado National Forest. Department of Defense lands also support the owl on Fort Huachuca Army Base in the Huachuca Mountains.

Recreation dominates land use within this unit. Livestock grazing is widespread but most intensive at low and middle elevations. Urban and rural development and mining modify portions of the Basin and Range-West landscape. Timber harvest occurs mainly on the Prescott National Forest and the San Carlos Apache Indian Reservation.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat to provide a platform to assess the effects of the action now under consultation.

Researchers surveyed all habitat meeting the criteria for restricted MSO habitat within the Castle Creek Wilderness and a 0.5 mile buffer for the presence of MSO in 1993 following Forest Service Region 3 protocol. The area was surveyed again during the breeding season of 1998 with one complete visit but did not meet the Forest Service Region 3 protocol standard of four complete visits. At this time, the Forest Service has assumed that inadequately surveyed habitat meeting target/threshold conditions is occupied (Bradshaw Ranger District 1998).

The Lorena Gulch Protected Activity Center (PAC 090305) is located outside and adjacent to the southwestern boundary of the project area. The 106 acre no activity area of this PAC is approximately 0.2 mile from the wilderness boundary although a small portion (0.1 mile) of the no activity area abuts the wilderness boundary. A pair of Mexican spotted owls were first recorded in 1990 and were present through 1994. In each year from 1995 through 1998, only a single female has been detected in the PAC. In 1992, nesting was suspected but not confirmed. The 1992 suspected nest area is also in the same general area where roost sites have been documented for the past eight years. The PAC (previously a management territory) has been monitored each year since 1990 (Table 2). Suppression actions would be taken to prevent any fire from escaping into this adjacent PAC. Additionally, the proposed 90 acres of MIF in the West Zone is intended to reduce fuel loads thereby protecting the PAC if a fire burns out of prescription (Bradshaw Ranger District 1998).

Table 2. Annual results of monitoring of the Lorena Gulch PAC (Bradshaw Ranger District 1998).

Year	Status
1990	Pair, nesting status unknown
1991	Pair, nesting status undetermined, no young
1992	Pair, nesting status unknown
1993	Pair, nesting status unknown
1994	Pair, nesting status unknown

Mr. Ernest Del Rio

Table 2. Annual results of monitoring of the Lorena Gulch PAC (Bradshaw Ranger District 1998). (Continued)

1995	Female, nesting status unknown
1996	Female, nesting status unknown
1997	Female, nesting status unknown
1998	Female, non-nesting, non-reproduction confirmed

The 25,227 acre wilderness area consists of 787 acres of ponderosa pine, 250 acres of ponderosa pine/Arizona oak, 560 acres of mixed conifer, 23,060 acres of chaparral and 66 acres of riparian habitat. Approximately four percent (876 acres) of the project area is comprised of habitat meeting the criteria for MSO restricted habitat.

The 66 acres of riparian habitat does not have the habitat characteristics necessary to support a pair of owls (Bradshaw Ranger District 1998). Even under the best conditions, Castle Creek or Poland Creek will not meet riparian broad-leaved forest or target/threshold descriptions. This riparian habitat does not provide a connection to any other MSO habitat.

The West Zone of the Castle Creek Wilderness is the only MSO habitat which meets the criteria for restricted habitat within the wilderness (Bradshaw Ranger District 1998). Within this habitat are 560 acres of mixed conifer and 250 acres of ponderosa pine/Arizona oak. PAC #090305 is immediately adjacent to the West Zone of the wilderness and MSO may forage within the wilderness.

Fire suppression has been very effective in eliminating the effects of fire on vegetation in Castle Creek (Bradshaw Ranger District 1998). Consequently, large quantities of downed woody material and over-mature manzanita exist in the ponderosa pine and mixed conifer zones due to lack of fire. The Castle Creek Wilderness has had 87 fires recorded in the past 23 years. The predicted number of fires in the next 10 years is 20-40 with an annual frequency of 2-4.

Past, present, and foreseeable Forest Service actions that have or will occur in the action area include the following seven projects (Bradshaw Ranger District 1998). As of the date of this document, the Service has not received any other information regarding section 7 consultation for these projects from the Forest Service.

Flag Mountain Fuel Break (1997)

This project included a shaded fuelbreak one mile in length and two hundred feet wide (24 acres) designed to protect the town of Crown King by removing heavy concentrations of fuel

Mr. Ernest Del Rio

and reducing crown density of the ponderosa pine and chaparral brush from the ridgeline critical to the suppression of any fire that should advance from the Castle Creek wilderness to the east.

Rhodes Small Tracts Act (1998)

The project is located at T10N, R1W, section 23, SE1/4. The proposed action includes a small tracts act involving 5.7 acres in ponderosa pine within the interior of PAC #090305. The National Forest System land surrounding the private parcel is an MSO PAC buffer. The parcel currently has a road easement on it and there are no expected changes in land use.

Rees Small Tracts Act (1998)

This project is located in T10N, R1W, Section 2 near Del Pasco Mine. The project includes selling less than 1/4 acre to the adjacent private landowner with no expected changes in land use. The tract is in the ponderosa pine, oak brush, and manzanita vegetation type. This tract is also surrounded by PAC #090310 and is located approximately 1.5 miles northwest of Crown King.

Corral Springs Fuel Reduction Project (near future)

MIF to be applied to 464 acres of forested land within the Basin and Range-West Recovery Unit. Of these acres, 270 are within PAC #090305. The project will not include applying MIF to any portion of the 106 acre buffer zone.

Horsethief Basin Fuel Reduction Project (near future)

In this area, approximately 8,000 acres will be treated with MIF and possibly some mechanical thinning over several years.

Private Landowner Fuel Reduction Projects (near future)

The community of Crown King is considering a combination of prescribed natural fire, pile burning, and mechanical treatment near the town of Crown King to reduce the risk of catastrophic wildfire to private property. To date, no boundaries have been defined for this project. PAC #090305 is located within one-half mile of the town of Crown King. This PAC surrounds private property.

Livestock Grazing (present, near future)

There is no livestock grazing within MSO habitat in the Castle Creek Wilderness or on the adjacent PAC.

Mr. Ernest Del Rio

A total of 222 projects have been formally consulted on in Arizona and New Mexico since August 1993. Those projects included 82 where incidental take of MSO was anticipated. Those projects have resulted in the anticipated incidental take of more than 183 MSO. The Forest Service has formally consulted on 211 of those projects. Sixty-eight of those projects have resulted in the anticipated incidental take of over 163 MSO.

EFFECTS OF THE ACTION

The Recovery Plan for the Mexican spotted owl encourages the use of prescribed natural fire where appropriate in wilderness. The Castle Creek Wilderness contains steep slopes, meets the criteria for restricted habitat, and is in a wilderness (reserved lands). In accordance with the Recovery Plan, the proposed PNF and MIF are intended to reduce fuel loads and the risk of catastrophic wildfire, increase biodiversity and patchiness (habitat heterogeneity), and maintain shade intolerant species such as ponderosa pine and Gambel oak (Bradshaw Ranger District 1998).

Castle Creek Wilderness is classified as reserved lands and is therefore categorized as protected habitat in the MSO Recovery Plan. The only habitat that meets the criteria for restricted is in the West Zone of Castle Creek (Bradshaw Ranger District 1998). The areas meeting target/threshold criteria total approximately 600 acres and are mainly within the mixed conifer habitat type.

One Mexican spotted owl PAC is located along the border of the wilderness area and is vulnerable to fire that may occur within the wilderness area. Although there are no PACs within the project area, all MSO habitat within the project area is protected per the definition of the recovery plan. The owl habitat was surveyed for only one year in 1993. No additional surveys are planned for the owl habitat outside of the planned MIF area. Thus, the owl habitat to be subjected to PNF will remain inadequately surveyed.

Prescribed natural fire (PNF) would be permitted to burn during the Mexican spotted owl breeding season (March 1-August 31). PNF could burn in unsurveyed or inadequately surveyed, potentially occupied Mexican spotted owl habitat (Bradshaw Ranger District 1998).

The proposed action for the Castle Creek PNF Plan was developed and tailored from the actual effects seen on the Thief Fire of 1996. That fire was a lightning caused fire which was allowed to burn to accomplish resource objectives. No more than 20 percent of each burn area, within habitat that meets the requirement for restricted MSO habitat (pine-oak or mixed conifer), would exceed flame lengths of four feet. Fire sizes of 50-500 acres could be expected. This prescription will improve habitat heterogeneity by creating small openings and thinning stands while retaining 40 percent-60 percent of key habitat components in 80 percent of the area (Bradshaw Ranger District 1998). The initial effects of fire are likely to be detrimental to Mexican spotted owl prey populations as cover and plant forage species would be reduced. In the long term, fire may enhance vegetative density and abundance. Patches of

Mr. Ernest Del Rio

unburned vegetation distributed throughout the burn area would provide refugia for small mammals and seed sources for post-fire colonization.

For MIF, low intensity surface fires (2-3 feet flame lengths) in the ponderosa pine, mixed conifer, and pine-oak associations are predicted to consume small trees and shrubs, 30-60 percent of surface litter, smaller limbs and snags, 5 percent of the large snags and 20-40 percent of logs over 12 inches dbh (Bradshaw Ranger District 1998). Hand-lining snags 18 inches dbh and greater and monitoring them during the fire will greatly reduce snag destruction.

Lightning strikes are most likely to occur during the summer months when air is unstable and generally dissipates rapidly. Prevailing winds over the wilderness are southwesterly. Thus, during the day, smoke will rise above the project area and be carried to the northeast (and not linger over the project area or the adjacent MSO PAC). During the night, smoke is expected to flow downslope into Hells Hole. Juniper Ridge, located between the PAC and the wilderness, should provide a topographic buffer between any prescribed natural fire and MSO PAC habitat. Topography will tend to shunt the smoke away from the PAC (Bradshaw Ranger District 1998).

The MSO Recovery Plan (USDI 1995) recognizes catastrophic fire as the greatest threat to MSO habitat. Prescribed and natural fire are extremely important management tools needed to enhance, and often to restore many of the ecosystem functions and processes. Reduction in habitat and various habitat-based threats have contributed to the listing of the MSO. The long-term benefits to the MSO of many land management actions may contribute, in the short-term, to certain adverse effects to the MSO. Prescribed and natural fire projects often fall into this category. Species such as the MSO, whose habitats have been reduced, degraded, or altered, may currently respond to fire differently than they did historically when fire occurred in a more natural setting. Therefore, it is important to address such concerns by minimizing, to the greatest extent practical, those short-term adverse effects, and move forward with proactive land management as fire is applied in efforts to restore ecosystem functions and community dynamics.

The MSO Recovery Plan (USDI 1995) encourages fire management programs which take an active role in fuels management and understand the ecological role of fire.

The Recovery Plan also recognizes that catastrophic wildfire is one of the primary threats to MSO in the Basin and Range-West RU. Therefore, fire plays the dual role of being both potentially beneficial and catastrophic to the owl and its habitat. The Service stresses the need to apply adaptive management when using fire. Prescriptions that maintain key structural features of owl and small prey habitats should be developed and tested. These features include large trees, snags, logs, and overstory. Treatments to produce or maintain such habitat components must be assessed by monitoring to evaluate if treatment objectives were met in both the short and long term. Wholesale use of fire without understanding or monitoring its

Mr. Ernest Del Rio

effects on habitat may render these areas unusable by owls, and may also miss opportunities to improve our knowledge of fire effects on these habitats (Moir *et al.* 1995).

The effects of the proposed action are divided into the following sections: Effects to MSO Habitat; Effects to Prey Species; Long-term Benefits, and; Effectiveness of Proposed Mitigation.

MSO Habitat

The Recovery Plan (USDI 1995) recognizes that prescribed natural fire may be beneficial to owl habitat in several ways: 1) it can aid in reducing fuel loads and the risk of catastrophic wildfire which may result in the loss of habitat over large areas; 2) it can create a diverse landscape with considerable horizontal heterogeneity which seems to be relatively characteristic of many areas occupied by spotted owls and also provides for a diverse prey base; 3) it can create conditions that maintain shade-intolerant species such as ponderosa pine or Gambel oak in the landscape.

Prescribed fire should be used carefully in owl habitat (USDI 1995). Fire is one of the most rapidly acting of natural disturbances. A crown fire can quickly consume vast tracts of forested habitat. After a large crown fire, habitat components for MSO nesting, roosting, and foraging are reduced or eliminated. Small-scale natural fires and prescribed burns, however, can reduce fuel loadings and create small openings and thinned stands that increase horizontal diversity and reduce the spread of catastrophic fire. Small-scale fires and lightning strikes also create snags, canopy gaps, and large downed logs, plus they perpetuate understory shrubs, grasses, and forbs which are important habitat components to the owl and its prey (Moir *et al.* 1995).

Fires have played an important role in the composition and structure of conifer forests. Generally, historic natural fires in ponderosa pine were light, its intensity depending of fuel loadings and weather conditions. This created a situation whereby some areas did not burn, some areas burned intensely with crown fires, and most areas burned lightly leaving large fire resistant trees, killing shrub topgrowth, and removing dead fuels (Wright and Bailey 1982). In mixed conifer forests, historic fires often were composed of intense, crown-replacement in small patches. Prescribed fire may be expected to alter mixed conifer habitats of the MSO in the short-term to a greater extent now than historically because the fuel accumulations that are characteristic of many MSO nest and roost sites generally place them at higher fire risk.

Injury to ponderosa pine from ground fires is generally confined to scorch of bark and lower branches because the thick bark of this tree insulates the cambium (Patton and Gordon 1995). Bradley *et al.* (1992) indicates that ponderosa pine trees that are heavily infected by the dwarf mistletoe (*Arceuthobium campylopodum*) are more susceptible to fire-related mortality and crown scorch than uninfected or moderately infected trees. On moist sites, ponderosa pine often forms two-storied stands that may be quite susceptible to crown fire. The tendency for

Mr. Ernest Del Rio

regeneration of ponderosa pine to form dense understories, or "dog-hair" thickets, on such sites creates fuel ladders that can carry surface fires to the crowns of overstory trees (Bradley *et al.* 1992). The thinning effect of fire is therefore much more pronounced in dense stands than it is in more open and mature stands. Heavy accumulations of litter at the base of pole and sawtimber-sized ponderosa pine increases the severity and duration of fire. Mature Douglas fir has relatively high resistance to fire damage. Saplings and small pole-sized trees of this species, however, are vulnerable to surface fires because of their thin bark (Bradley *et al.* 1992). Douglas fir occurs in open stands, but it also grows in dense stands with continuous under-story fuels. Dense sapling and thickets of pole-sized trees can form an almost continuous layer of flammable foliage 10-26 feet above the ground that will support wind-driven crown fires. Crowning is often aided by the presence of lichens. Crowning and "torching" of individual Douglas fir is also aided by the presence of large, dense witches'-brooms caused by the dwarf mistletoe. As with ponderosa pine, heavy fuel accumulations at the base of Douglas fir increases the probability of fire injury. Heavy litter accumulations may allow injury to tree roots, causing delayed mortality and often resulting in sterilization of soils (Bradley *et al.* 1992).

Prescribed natural fire is likely to create small openings in the canopy caused by single or groups of trees crowning. The Service believes the risk of trees crowning is more probable in MSO nesting/roosting habitat. The location of quality owl habitat often corresponds to characteristics that put these sites at higher risk of crowning such as dense, multi-layered canopies, the presence of mistletoe "brooms" and high fuel loadings resulting from high densities of down logs. The loss of some of the lower branches in the canopy may have some effect on MSO foraging. MSO utilize the "perch and pounce" method of hunting, using the lower branches of trees for perching. The loss of some perching sites when burning within prescription is not expected to significantly affect the ability of MSO to forage successfully.

The random nature of lightning does not allow for predicting where, when, or how many PNFs may occur in the project area. It is expected that the vast majority of lightning that may result in a fire will likely occur during the summer months. Under the proposed action, PNF will be permitted to burn within unsurveyed restricted and protected owl habitat during all times of the year, including the MSO breeding season of March 1 through August 31. Although the Recovery Plan (USDI 1995) encourages the use of PNF, both of these actions do not follow the specific recommendations of the Recovery Plan and therefore may result in adverse effects to individual MSO and habitat. PNF within unsurveyed owl habitat during the breeding season may result in the direct or indirect death of adult and young MSO due to loss of nest/roost trees caused by individual or groups of trees crowning. In addition, the effects of smoke on adult and young owls is largely unknown and may directly affect the health of owls or the ability of owls to forage successfully, and therefore may affect the ability of adults to survive and/or successfully fledge young.

Given that the locations and number of the lightning strikes cannot be predicted, and that the Forest Service has not put an upper limit on the size of any PNF, it is possible that all owl

Mr. Ernest Del Rio

habitat as well as potentially occupied restricted and protected habitat may be affected by PNF under the Castle Creek Wilderness Prescribed Natural Fire Plan. In addition, it is possible that owl habitat and potentially occupied habitat may be burned multiple times. The potential effects of burning owl habitat more than once may include an increased loss of down woody material and snags, and the creation of multiple gaps in the canopy which could affect the overall canopy closure of a nest/roost habitat, thereby affecting the microclimate of the site, and a potential increase in the number of snags created through crowning. The effect of burning owl habitat across the landscape and potentially occupied habitat are unknown, but may include the short-term loss or reduction of owl reproduction and the resulting movement of owls to unburned areas either within or outside the project area.

Direct effects of PNF on MSO may include possible death by burning or carbon monoxide poisoning. This may be particularly true with young owls. Patton *et al.* (1991) found lower survival rates among radio-tagged female northern spotted owls following a forest fire. This was attributed to radio tags, but the birds in this study were exposed to dense smoke and high levels of carbon monoxide by an inversion that trapped smoke near the ground for 25 days following a fire which burned for 50 days. Flames and smoke from fire may cause MSO to flush from nests and/or roosts, and may impair hunting opportunities through interfering with audio and visual methods of detecting prey. Given that PNF may occur within unsurveyed owl habitat, there exists some possibility that nest and/or roost trees may be killed through crowning or extreme heat. All of these may result in direct mortality, failed reproductive efforts and/or starvation of young and adult MSO.

Disturbance to the MSO may also be caused by human activities in, adjacent, and above PACs and potentially occupied habitat during PNF. Disturbance may be caused by fire resource personnel digging fire lines with shovels and other hand tools, walking and igniting with drip torches if "burning out" is needed to control a PNF, and monitoring fire conditions from the ground or air. Human disturbance in an occupied PAC during the breeding season may result in failed reproductive efforts, abandonment of the nest, and/or starvation of young.

Regardless of detailed planning and the use of the best fire science, there exists the possibility that a PNF may burn out of prescription and become a wildfire. The most likely reason for a PNF to go out of prescription would be a change in weather conditions such as wind speed or direction which would result in a subsequent change in fire behavior. The most devastating wildfire would be one that travels into the tree crowns and results in stand replacement over a large area. The results to the MSO of a PNF becoming a wildfire may include the direct loss of MSO, as well as loss of nest/roost habitat located in PACs as well as potentially occupied nest/roost habitat. If a wildfire occurs in such habitat during the breeding season, the fire may result in the loss of owl nests as well as young owls who may not be able to fly to safety. Wildfires that burn hot will result in the loss of owl prey habitat such as down logs and unburned snags. In addition to the direct loss of owl nest/roost habitat caused by a wildfire, effects to owls may also be caused by the actions taken to suppress the fire. These actions include back burning to contain the PNF and prevent its further growth, the use of chainsaws

and the cutting of trees, the use of retardant planes and the dropping of slurry, the use of helicopters and the dropping of water, and the presence of humans in PACs and activity centers. The result of a stand replacement wildfire in large areas of nest/roost habitat in the project area includes the loss of the use of that habitat by MSO the year of the action and well into the future.

Prey Habitat

The effects of fire include both negative and beneficial effects on MSO habitat. Beneficial aspects would include increased response of herbaceous vegetation after a fire. Negative effects would include the loss of MSO prey habitat components such as herbaceous cover, down logs and snags. The effects of fire on the prey base of the MSO are complex and are dependent on the variations in fire characteristics and in prey habitat. Fire intensity, size, and behavior are influenced by numerous factors such as vegetation type, moisture, fuel loads, weather, season, and topography. Fire can effectively alter vegetation structure and composition thereby affecting small mammal habitat. The initial effects of fire are likely to be detrimental to rodent populations as cover and plant forage species would be reduced.

Population responses by small mammals to fire-induced changes in their habitat vary. For example, deer mouse populations might increase immediately following fire and then decrease through time (Ward and Block 1995). Campbell *et al.* (1977) noted that populations of peromyscid mice decreased immediately following fire in an Arizona ponderosa pine forest that removed one-fourth (moderately burned) to two-thirds (severely burned) of the basal area; populations then returned to pre-fire numbers two years following the burn. Further, no differences were found in rodent populations between moderately and severely burned areas. They concluded that the effects of the fire were short-term, and the short-term positive numerical responses of mice were attributed to an increase in forage, particularly grasses and forbs after the fire (Ward and Block 1995). Irvine (1991) documented post-fire declines in deer mice populations at study sites on the Coconino National Forest. Irvine attributed these declines to reduced food supplies. Lowe *et al.* (1978) noted an increase in deer mice populations the first year after a fire in ponderosa pine near Flagstaff, Arizona. Small mammal diversity and densities are typically depressed for one to three years after a fire (Wright and Bailey 1982). Biswell *et al.* (1973) suggested that rodent populations would be less affected during fall fires because, at that time of year, rodents have accumulated seed caches that will mitigate loss of food sources. Predation of surviving rodents that are part of the diet of the MSO may increase immediately after the fire. In one study in northern California, radio-collared northern spotted owls spent considerable time in burned-over areas. This activity was assumed to be due to easy capture of prey (Patton and Gordon 1995).

It is suspected that the effects of intense stand-replacing wildfires that dramatically alter forest structure and move the system to earlier seral stages would have longer-term effects on some rodent populations. Likely, early successional species such as deer mice and those that require open habitat with a well-developed herbaceous under-story, such as microtine voles and pocket

gophers, would benefit. In contrast, species that require a wooded or forested over-story would exhibit population declines. The net effect of such fires on the MSO is unclear: a fire that removes the tree canopy would likely render a portion of the area unusable for foraging by MSO, but if the spatial extent of crown loss is limited, a mosaic is created that could provide a diversity of prey for the owl and actually be beneficial (Ward and Block 1995). Because owl prey species evolved in ecosystems where fire was a natural process, we assume that historically, these species survived, and some even benefitted from the occurrence of fire. Fire has been excluded from most southwestern ecosystems during the 20th century, resulting in systems where fire behavior may deviate substantially from natural conditions. Effects of fire on small mammals under present environmental conditions are unclear (Ward and Block 1995).

Ward and Block (1995) examined correlates between the MSO's diet and reproduction. Their results suggested that the owl's reproductive success was not influenced by a single prey species, but by many species in composition. None of the specific prey groups significantly influenced owl reproductive success, but rather, they concluded it was more likely that the owl's reproductive success was influenced by total prey biomass consumed in a given year, rather than by a single prey species. More young were produced when moderate to high amounts of the three most common prey groups (woodrats, peromyscid mice, and voles) were consumed.

Prescribed natural fire conducted within the proposed prescriptions is likely to have immediate short-term adverse effects to MSO prey habitat. Although fire may enhance vegetative density and abundance in the long-term, short-term effects of burning, particularly in the spring and early summer when herbaceous vegetation is most critical for reproducing rodents, may limit available forage immediately after the fire event. Nesting MSO would also be most affected during this time as they would require a consistent supply of prey to successfully fledge young.

Long-term Benefits of PNF

Reintroducing fire into the ecosystems of northern Arizona can have many benefits and may improve long-term "ecosystem management" objectives. Among these are the reduction of woody fuels which would decrease the possibility of intense, stand-replacing fires and resulting erosion, soil sterilization, and increased plant mortality. Ultimately, if fire continues to be excluded from the system, a major wildfire will occur with potentially devastating effects to the MSO and its habitat. In the pre-settlement era, low-intensity fires that removed small trees and ground fuels, but rarely killed mature trees, probably occurred at frequent intervals. Implementing the proposed action would reduce fuels and hopefully begin to restore a natural fire regime in which frequent, low-intensity fire would act to maintain a mosaic of fuel loads across the area.

Effectiveness of Protective Measures

The Service believes the mitigation measures proposed by the Forest Service for PNF actions represent the nature of the unpredictability of PNF and the use of PNF. The Service understands that implementation of specific recommendations of the Recovery Plan that assist in reducing potential adverse effects to the MSO and its habitat would be very costly or difficult to implement. However, without certain mitigation measures in place, the Service believes there may be short-term adverse effects to MSO and MSO habitat. Specifically, the Service believes that PNF that occurs within unsurveyed habitat during the breeding season may adversely affect the MSO and its habitat. The lack of an upper size limit of individual and cumulative PNF actions may also result in an unacceptable level of adverse effect to the MSO and its habitat in the project area. In addition, the effects of fire on the owl and to a certain extent on its prey habitat, are unpredictable. Combined with the uncertainty of fire behavior and weather itself, adverse effects may occur in the form of fires burning out of prescription or in the form of wildfires. The Service believes that the Castle Creek Wilderness PNF Plan needs be viewed as a working document, and should be subject to constant evaluation and modification if and when needed, based on the results of each year's burning and monitoring. Applying new information to land management decisions as it is developed is an important aspect of adaptive management.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in the foreseeable future. Future Federal actions are subject to the consultation requirements established under sections 7, and, therefore, are not considered cumulative in the proposed action. In past Biological Opinions, it has been stated that, "Because of the predominant occurrences of the MSO on Federal lands, and because of the role of the respective Federal agencies in administering the habitat of the MSO, actions to be implemented in the future by non-Federal entities on non-Federal lands are considered of minor impact." However, there has been a recent increase of harvest activities on non-Federal lands within the range of the MSO. In addition, future actions within or adjacent to the project area that are reasonably expected to occur include urban development, road building, land clearing, logging, fuelwood gathering, trail construction, and other associated actions. These activities reduce the quality and quantity of MSO nesting, roosting, and foraging habitat, cause disturbance to breeding MSO and would contribute as cumulative effects to the proposed action. Aside from the following paragraph, no additional information regarding non-Federal actions that are reasonably certain to occur was provided by the Forest Service.

Although it was included in the Environmental Baseline section of this document, description of one action(s) (Private Landowner Fuel Reduction Projects) that may be private and reasonably certain to occur was provided in Bradshaw Ranger District (1998). The community

of Crown King is considering a combination of prescribed natural fire, pile burning, and mechanical treatments near the town of Crown King to reduce the risk of catastrophic wildfire to private property. To date, no boundaries have been defined for this project. PAC #090305 is located within one-half mile of the town of Crown King. This PAC surrounds private property.

SUMMARY OF EFFECTS AND CONCLUSION

After reviewing the current status of the MSO, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Castle Creek Wilderness Prescribed Natural Fire Plan, as proposed, is not likely to jeopardize the continued existence of the MSO.

INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Forest Service has a continuing responsibility to regulate the activity covered by this incidental take statement. If the Forest Service (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

For the purposes of consideration of incidental take of MSO from the proposed action under consultation, incidental take can be anticipated as either the direct mortality of individual birds, or the alteration of habitat that affects the behavior (i.e. breeding or foraging) of birds to such

Mr. Ernest Del Rio

a degree that the birds are considered lost as viable members of the population and thus "taken." They may fail to breed, fail to successfully rear young, raise less fit young, or desert the area because of disturbance or because habitat no longer meets the owl's needs.

In past Biological Opinions, the management territory was used to quantify incidental take thresholds for the MSO (see Biological Opinions provided by the Service to the Forest Service from August 23, 1993 through 1995). The current section 7 consultation policy provides for incidental take if an activity compromises the integrity of a PAC. Actions outside PACs will generally not be considered incidental take, except in cases when areas that may support owls have not been adequately surveyed.

Using available information as presented within this document, the Service has identified conditions of probable take for the MSO associated with unsurveyed or inadequately surveyed restricted and protected habitat. Based on the best available information concerning the MSO, habitat needs of this species, the project description, and information furnished by the Forest Service, take is anticipated for the MSO as a result of the following:

- a) Prescribed natural fire which is permitted to burn in unsurveyed, potentially occupied restricted and protected MSO habitat.
- b) Prescribed natural fire permitted during the MSO breeding season.
- c) The unknown upper size limits of both individual and cumulative PNF actions in unsurveyed, potentially occupied habitat.
- d) The unpredictable nature of fire behavior and the weather, which may result in: 1) the fire burning out of prescription and detrimentally affecting habitat, and perhaps requiring suppression, and; 2) the fire burning out of prescription, becoming a wildfire, and then requiring suppression.

AMOUNT OR EXTENT OF TAKE

This biological opinion anticipates the following forms and amounts of take in regard to the proposed action:

DIRECT MORTALITY

- A) One MSO or one pair and/or associated eggs/juveniles in the form of direct mortality resulting from owls killed or injured by fire, smoke, or heat for PNF actions that are within prescription.

HARM AND HARASSMENT

Mr. Ernest Del Rio

The following incidental take is an upper limit anticipated for the life of the proposed action. Any such take will be reported to the Service on an annual basis (see Reasonable and Prudent Measures). Only that incidental take as described below which occurs will be tallied and reported in the MSO baseline. Therefore, although the Forest Service is permitted the incidental take below, such take will not be counted unless it occurs. Take will be tallied when any PAC is affected (see below) and when each increment of 500 acres of unsurveyed MSO habitat is affected by PNF.

- B) Harm and harassment of MSO and habitat modification of up to 500 acres of restricted and protected MSO habitat (habitat which has not been surveyed to protocol, or for which protocol surveys have been conducted, but for which more than one breeding season has elapsed) per year caused by PNF for which adequate MSO surveys have not been conducted.
- C) Harm and harassment of MSO and habitat modification of up to one PAC and 500 acres of restricted and protected MSO habitat caused by wildfire as an indirect result of PNF during the life of the Castle Creek Wilderness Prescribed Natural Fire Plan (i.e., an escaped PNF that is declared a wildfire or is otherwise burning out of the PNF prescription).

The Service anticipates incidental take of MSO located in unsurveyed/inadequately surveyed restricted and protected habitat will be difficult to detect because finding a dead or impaired individual is unlikely due to the large acreage of potentially affected habitat in the project area and the remoteness of much this habitat.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the MSO.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take.

- 1) The Forest will implement the proposed actions in a manner that minimizes adverse effects to MSO and occupied and potentially occupied MSO restricted and protected habitat.
- 2) Personnel education/information programs and well-defined operational procedures shall be implemented.
- 3) If fire suppression is initiated, suppression activities shall be carried out in a manner to reduce potential adverse effects to the MSO and its habitat, unless such actions would harm life or property. This represents the indirect effects of PNF that burn out of prescription.

The declaration of wildfire suppression actions are considered emergency actions which require separate consultation.

- 4) The Forest shall document all actions, report incidental take, and monitor the effects of the proposed action on habitat. These findings shall be reported to the Service.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of ESA, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary. Although several of these measures were included in the project description in a particular form, the Service believes that inclusion of those measures as terms and conditions facilitates clarity and tracking.

- 1.1 The Forest Service shall suppress all PNF actions if it is anticipated that the fire may burn out of prescription in the following 24 hours. The Forest Service may choose to suppress PNF actions prior to this.
- 1.2 If more than 500 acres of restricted and protected MSO habitat are affected by PNF in a given year, then the Forest Service will reconsult with the Service.
- 1.3 If combined MIF, PNF, and wildfire (of any cause) affect more than 1000 acres of restricted and protected MSO habitat during the life of the Plan, then the Forest Service will reconsult with the Service.
- 1.4 PNF will be allowed in MSO habitat only under those respective prescriptions as described in the March 2, 1999, modification of the project description. In addition, the following component will be added to those prescriptions. PNF will not be allowed to burn in MSO habitat unless 1000-hour full moisture is equal to or greater than 11 percent.
- 2.1 Protection measures regarding notification of personnel and operations will be implemented as described in the January 14, 1999, modification of the project description.
- 2.2 The Forest Service shall notify the Service within five working days of any declared PNF actions within the project area.
- 3.1 Protection measures regarding fire suppression will be implemented as described in the January 14, 1999, modification of the project description.
- 4.1 By February 1 of each year, prior to further PNF that year, the Forest Service shall

submit a report to the Arizona Ecological Service Office detailing the previous year's actions. The Report shall document the areas and acreage burned, the type of fire (MIF, PNF, wildfire), the name(s) of any PAC(s) affected, the amount of unoccupied MSO habitat affected, the extent of any suppression actions, the effectiveness of these terms and conditions, information about MSO monitored or encountered, any rehabilitation completed, quantification of any incidental take as defined in this biological opinion, and any recommendations for actions in the upcoming year(s). A map shall be provided to the Service of fire that occurs each year. The Forest Service shall keep and maintain a map depicting cumulative fire information for the project area. By March 1 of each year, prior to any PNF implementation that year, the Forest Service will meet with the Ecological Services Office to review the report and discuss the following year's actions relative to the previous year's actions and cumulative actions.

- 4.2 The Forest Service will ensure that sufficient monitoring of the effects of fire on key habitat components of MSO habitat will be conducted after each PNF event. The intent of this required monitoring is to completely and adequately determine the effects of the PNF event on the key habitat components. The Forest Service, at a minimum, will accomplish qualitative walk-throughs during and after the events. A summary narrative and photographs fully and completely explaining the effects of the event on the key habitat components of MSO habitat will be produced.
- 4.3 Additional monitoring of the effects of PNF on certain key habitat components will be conducted as described in the March 2, 1999, modification of the project description.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

The Fish and Wildlife Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. Sections 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. Sections 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

DISPOSITION OF DEAD, INJURED, OR SICK MSO

Upon locating a dead, injured, or sick MSO, initial notification must be made to the Service's Law Enforcement Office, Federal Building, Room 8, 26 North McDonald, Mesa, Arizona

(telephone: (602) 835-8289) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state. If possible, the remains of intact owl(s) shall be provided to this office. If the remains of owl(s) are not intact or are not collected, the information noted above shall be obtained and the carcass left in place. Injured animals should be transported to a qualified veterinarian by an authorized biologist. Should treated owls survive, the Service should be contacted regarding the final disposition of the animal.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of ESA directs Federal agencies to utilize their authorities to further the purposes of ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. The Forest Service should take an active role in continuing surveying the approximately 876 acres of restricted and protected MSO habitat in the project area that may be affected by PNF. Given current Forest Service funding constraints, other means of funding should be explored to assist in this effort.
2. The Forest Service should pursue the completion of a forest-wide consultation on wildfire suppression activities.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in the draft biological evaluation and draft environmental assessment. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Mr. Ernest Del Rio

27

Thank you for your consideration of threatened and endangered species. For further information please contact Bill Austin or Bruce Palmer. Please refer to the consultation number 2-21-98-F-284 in future correspondence concerning this project.

Sincerely,

A handwritten signature in black ink, appearing to read "David L. Harlow", with a long horizontal flourish extending to the right.

David L. Harlow
Field Supervisor

cc: Forest Supervisor, Prescott National Forest, Prescott, Arizona

Literature Cited

- Biswell, H.H., H.R. Kallander, R. Komarek, R.J. Vogel, and H. Weaver. 1973. Ponderosa fire management. Tall Timbers Research Station. Misc. Publ. No. 2. Tall Timber Research Station, Florida.
- Bradley, A.F., N.V. Noste, and W.C. Fischer. 1992. Fire ecology of forests and woodlands in Utah. General Technical Report INT-287. USDA Forest Service. 128 pp.
- Bradshaw Ranger District. 1998. Biological assessment for Castle Creek Wilderness prescribed natural fire plan. Bradshaw Ranger District, Prescott National Forest, Prescott. 8 pp. With appendix.
- Campbell, R.E., M.B. Baker, Jr., P.F. Ffolliott, R.R. Larson, and C.C. Avery. 1977. Wildfire effects on a ponderosa pine ecosystem: an Arizona case study. USDA For. Serv. Res. Pap. RM-191. 12 pp.
- Fletcher, K. 1990. Habitat used, abundance, and distribution of the Mexican spotted owl, *Strix occidentalis lucida*, on National Forest System Lands. U.S. Forest Service, Southwestern Region, Albuquerque, New Mexico. 78 pp.
- Irvine, L. 1991. Disturbance and small mammals: effects of prescribed fire on white-footed mice (*Peromyscus*). MS Thesis. Northern Arizona University.
- Lowe, P.O., P.F. Ffolliott, J.H. Dieterich, and D.R. Patton. 1978. Determining potential wildlife benefits from wildfire in Arizona ponderosa pine forests. Gen. Tech. Rep. RM-52. Rocky Mountain Forest and Range Experiment Station.
- Moir, W.H., J.L. Dick, Jr., W.M. Block, J.P. Ward, Jr., R. Vahle, F.P. Howe, and J.L. Ganey. 1995. Conceptual framework for recovery (17 pp), in Recovery Plan for the Mexican spotted owl. Vol. II. USDI Fish and Wildl. Serv., Albuquerque, NM.
- Patton, D.R., and J. Gordon. 1995. Fire, habitats, and wildlife. Final Report submitted to USDA Forest Service, Coconino National Forest. 85 pp.
- Patton, P.W.C., C.J. Zabel, D.L. Neal, G.N. Steger, N.G. Tilgham, and B.R. Noon. 1991. Effects of radio tags on spotted owls. J. Wildl. Manage. 55(4):617-622.
- U.S. Department of the Interior, Fish and Wildlife Service. 1991. Mexican spotted owl status review. Endangered species report 20. Albuquerque, New Mexico.
- U.S. Department of the Interior, Fish and Wildlife Service. 1993. Endangered and threatened

Wildlife and Plants; final rule to list the Mexican spotted owl as threatened. Federal Register. 58:14248-14271.

U.S. Department of the Interior, Fish and Wildlife Service. 1995. Mexican Spotted Owl Recovery Plan. Albuquerque, New Mexico.

U.S. Forest Service. 1998. Region 3, 1998 protocols for implementation and effectiveness monitoring: Mexican spotted owl microhabitat. Southwestern Region, Albuquerque. 20 pp.

Ward, J.P. Jr., and W.M. Block. 1995. Mexican spotted owl prey ecology. Chapter 5 (48 pp) *in* Recovery Plan for the Mexican spotted owl. Vol. II. USDI Fish and Wildl. Serv., Albuquerque, NM.

Wright, H.A., and A.W. Bailey. 1982. Fire ecology, United States and Canada. John Wiley and Sons, New York. Pages 297-303.